

UNIT-1 INTRODUCTION TO COMPUTERS

DEFINE COMPUTER / WHAT IS COMPUTER?

A computer can be defined as ‘ Electronic Device, which can automatically accept and store input data, process them, and produce output results according to the instructions given by the programmer or user’.

CHARACTERISTICS OF COMPUTER

A computer can be characterized by following points:

NOTE : THE FIRST FIVE CHARACTERISTICS ARE ADVANTAGES OF COMPUTER AND LAST TWO CHARACTERISTICS ARE DISADVANTAGES.

1) Speed :

- It is very fast device.
- It can perform the task in few milliseconds for which a normal human being may take years to complete.

2) Accuracy :

- The accuracy of computer is very high.
- In most cases, errors are due to human factors instead of technological factors.
- For ex., errors cause due to improper logic of programmer or incorrect input data called GIGO (Garbage In Garbage Out)

3) Diligence :

- Computers are free from monotony, tiredness and lack of concentration.
- It never gets bored of doing its task.
- If 10 million calculations have to be performed, a computer will perform 10th million calculation with the same accuracy as the 1st one.

4) Versatility :

- Computers are capable to perform almost any task.
- The same computer can be used for multiple tasks.
- For ex: you can prepare your essay in MS WORD, simultaneously you may be printing a report or surfing the internet etc.

5) Power of remembering (storage capacity) :

- Computers can store and retrieve any amount of information because of its secondary storage.
- The information is retained (stored) accurately as long as desired by the user.

6) No IQ :

- It has no intelligence.
- It has to be told what to do and in which sequence.
- Computers can not take decision on its own.

7) No feelings

- Computers do not have natural feelings since they are machines.
- Their feelings are based on the instructions given to them in the form of programs written by us.

APPLICATIONS OF COMPUTERS

Computers play a role in every field of life. They are used in homes, business, educational institutions, research organizations, medical field, government offices, entertainment, etc.

HOME

- Computers are used at homes for several purposes like online bill payment, watching movies or shows at home, home tutoring, social media access, playing games, internet access, etc.
- They provide communication through electronic mail.
- They help to avail work from home facility for corporate employees.
- Computers help the student community to avail online educational support.

MEDICAL FIELD

- Computers are used in hospitals to maintain a database of patients' history, diagnosis, X-rays, live monitoring of patients, etc.
- Surgeons nowadays use robotic surgical devices to perform delicate operations, and conduct surgeries remotely.
- Virtual reality technologies are also used for training purposes.

ENTERTAINMENT

- Computers help to watch movies online, play games online; act as a virtual entertainer in playing games, listening to music, etc.
- Videos can be fed from computers to full screen televisions.
- Photo editors are available with fabulous features.

INDUSTRY

- Computers are used to perform several tasks in industries like managing inventory, designing purpose, creating virtual sample products, interior designing, video conferencing, etc.
- Online marketing has seen a great revolution in its ability to sell various products to inaccessible corners like interior or rural areas.
- Stock markets have seen phenomenal participation from different levels of people through the use of computers.

EDUCATION

- Computers are used in education sector through online classes, online examinations, referring e-books, online tutoring, etc.
- They help in increased use of audio-visual aids in the education field.

GOVERNMENT

- In government sectors, computers are used in data processing, maintaining a database of citizens and supporting a paperless environment.
- The country's defence organizations have greatly benefited from computers in their use for missile development, satellites, rocket launches, etc.

BANKING

- In the banking sector, computers are used to store details of customers and conduct transactions, such as withdrawal and deposit of money through ATMs.
- Banks have reduced manual errors and expenses to a great extent through extensive use of computers.

BUSINESS

- Nowadays, computers are totally integrated into business.
- The main objective of business is transaction processing, which involves transactions with suppliers, employees or customers.
- Computers can make these transactions easy and accurate.
- People can analyze investments, sales, expenses, markets and other aspects of business using computers.

TRAINING

- Many organizations use computer-based training to train their employees, to save money and improve performance.
- Video conferencing through computers allows saving of time and travelling costs by being able to connect people in various locations.

ARTS

- Computers are extensively used in dance, photography, arts and culture.
- The fluid movement of dance can be shown live via animation.

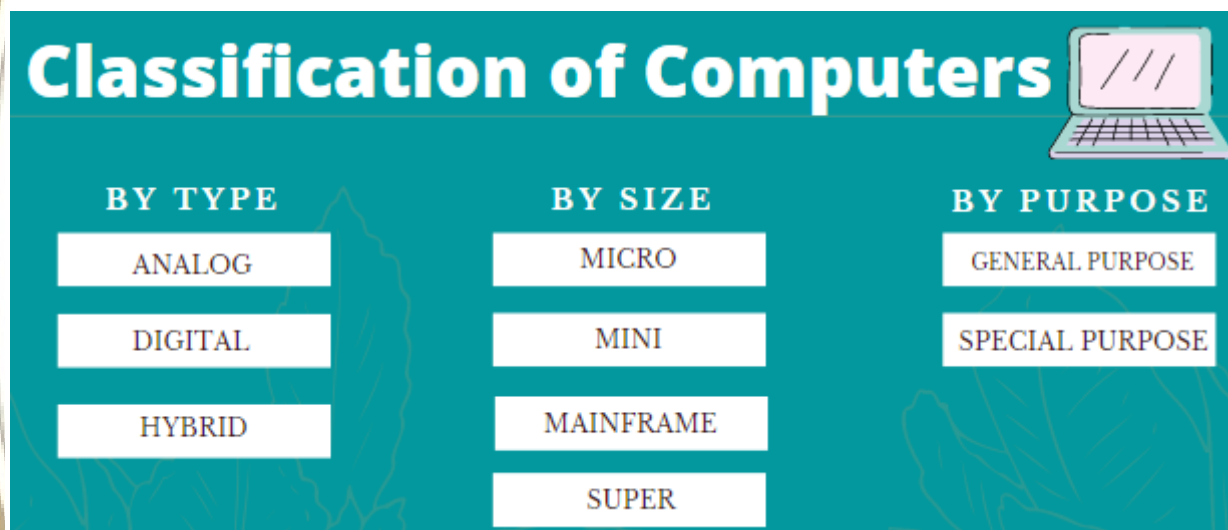
- Photos can be digitized using computers.

SCIENCE AND ENGINEERING

- Computers with high performance are used to stimulate dynamic process in Science and Engineering.
- Supercomputers have numerous applications in area of Research and Development (R&D).
- Topographic images can be created through computers.
- Scientists use computers to plot and analyse data to have a better understanding of earthquakes.

TYPES OF COMPUTERS

Computers can be classified in many ways. The most common way to classify the computer is according to working principle, purpose and size.



BY TYPE

1. **Analog Computer**– It is used to process analog data. Analog computer operates by measuring rather than counting. An analog computer measures continuous electrical or physical magnitudes. An analog computer has the ability to accept inputs which vary with time and intensity and directly apply them to various devices which perform desired operation. It produces output in the form of graph.
2. **Digital Computer**-
A digital computer operates directly on decimal digit that represents either discrete data or symbols. It converts the data into digits and then all operations are done on these digits at

extremely fast rates. Digit computer basically knows how to count the digits.

Computers used for business and scientific application are digital computers.

3. **Hybrid Computer** – Hybrid computer utilize the best qualities of both analog and digital computers. They are suited for situation where digital processing of data collected in analog form is desirable.

BY PURPOSE

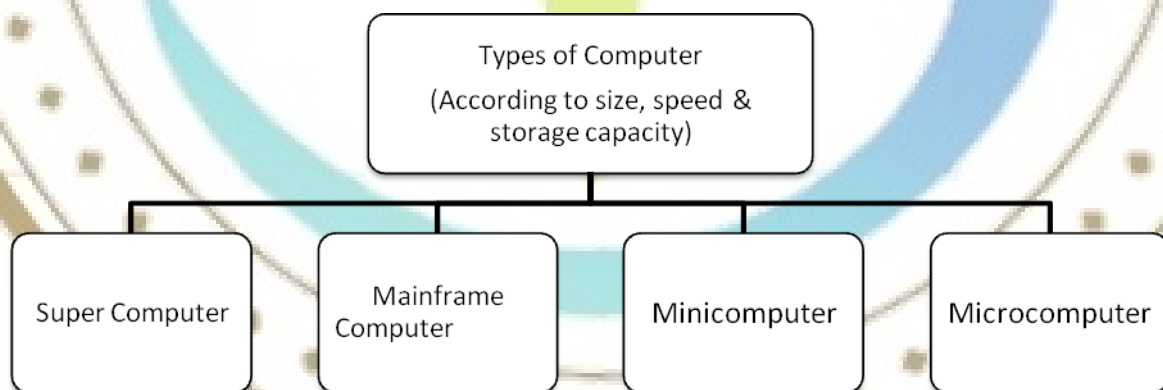
1. **General Purpose Computer** – These computer can store different programs and can be used in countless application. A General Purpose Computer can perform any kind of jobs with equal efficiency simply by changing the application program stored in main memory.
2. **Special Purpose Computer** – A Special Purpose Computer is the one that is designed to perform only one special task. The program or instructions set is permanently stored in such a machine. It does its single task very quickly and it cannot be used for any other purpose.

These computers are often used to perform specific function such as controlling a manufacturing process or directing communications.

BY SIZE

On the basis of size, speed and storage capacity, computers can be classified as :

- 1) Supercomputer
- 2) Mainframe Computer
- 3) Minicomputer
- 4) Microcomputer



- 1) Supercomputer
 - These computer systems are characterized by very high processing speed.
 - They are most expensive of all the computers.
 - These computers are very big in size.

- They are capable of executing more than 10,000 millions instruction per second and have very high storage capacity.
- Examples of supercomputer : CRAY1, CRAY2, CRAY3, PARAM 10000 etc
- Applications of these computers include:
 - solve mathematical problems
 - atomic nuclear power stations & nuclear energy research
 - aerodynamics
 - weather forecasting & climate research,
 - defence system of country
 - Medical & electronic design.

2) Mainframe Computer

- These are high capacity computer that are mainly used for bulk data handling & information processing.
- They are used in environments where a large number if users need to share a common computing facility.
- There size & speed are slightly lesser as compared to supercomputers.
- Examples of Mainframe computers : IBM3090, IBM4300 etc
- Applications of these computers include:
 - Railway & Airline Reservation
 - Banking Application

3) Minicomputer

- They are smaller version of the mainframes. Means, their size, speed & storage capacity is lesser than mainframes.
- It is cheaper in cost, smaller in size and reliable.
- It does not require air conditioning and can be operated in room temperature.
- They have many terminals connected to it for supporting many users.
- Examples of Minicomputer : PDP-1
- Applications of these computers include:
 - Education and local government offices
 - In business they are used for payroll calculation etc.
 - Mainly used in distributed systems.

4) Microcomputer

- A microcomputer is a computer whose CPU is a microprocessor.
- A microprocessor is a processor all of whose component are on a single integrated circuit chip.
- Personal computers are a kind of micro computer.

- Personal computers are so called because they are designed for personal use of individual or individual small business units' office automation unit or professionals.
- The microcomputers are smaller enough to fit on a desk rather than the bigger server rooms.
- Most of the equipments used in microcomputer are tightly integrated within a single case, although some equipment may be connected at short distances outside the case such as monitor, keyboard, mouse etc.
- They are cheap enough to be owned by an individual.
- The configuration of PCs varies from machine to machine and its cost depends on configuration.
- PCs are used by children & adults for education, entertainment & other purposes.
- PCs are very common everywhere
- Applications of PCs are
 - o computer literacy
 - o fun and games
 - o business applications
 - o programming etc.

TYPES OF MICRO COMPUTER OR PERSONAL COMPUTERS

- Desktop Computer
- Portable Computer
 1. Laptop Computer
 2. Notebook
 3. Tablet
 4. Smart phones

DESKTOP COMPUTER

- A **desktop computer** is a computer that fits on or under a desk.
- It has a monitor or another display, keyboard, mouse, and a system unit.
- Unlike a laptop, which is portable, a desktop computer usually stays at one location, means they are not portable.
- They are not battery operated, so continuous power supply is required for its functioning.
- Initially, desktop computers used CRT (cathode Ray Tube) display monitors, but now, LCD, LED or OLED screen are also used widely.
- They are available in variety of configuration, & its cost varies from configuration to configuration.
- They are most common and widely used everywhere in offices, hospitals, hotels, educational institution, and library and so on.

PORTABLE COMPUTER

LAPTOPS/NOTEBOOKS:

- Laptop is a portable computer. Means, a user can carry it around.
- Since laptop looks like a notebook, sometimes, they are also known as Notebooks.
- Generally, Notebooks are slightly smaller in size as compared to typical laptop. Rest other features of notebook computers are similar to Laptop.
- Laptops are small computers having all features of desktop.
- One major advantage of laptop is that we can use it anywhere & at anytime, especially when travelling.
- Laptops do not need any external power supply, because rechargeable battery is self-contained in them.
- Laptop computers are expensive as compared to desktop.

TABLETS/PDAS:

- Tablet computers are portable & slightly bigger than calculator in size.
- They can be easily stored or kept in a pocket and can be used while the user is holding it in hand.
- It used pen or electronic stylus or virtual keyboard, instead of physical keyboard for the input.
- PDAs have very small monitor screen.
- Since these computers can easily fit into one's palm. They are also known as Palmtops.
- These computers do not have hard-disk. They use small memory cards to store data.
- They have limited memory and are less powerful as compared to desktop and laptops

SMART-PHONES

- A smart phone is a handheld electronic device that provides a connection to a cellular network.
- Smart phones allow people to make phone calls, send text messages & access the internet.
- Basically, your smart phone is a mini-radio that is constantly on the receiving end of other signals.
- The majority of these devices (smart phone) run on any of popular mobile Operating system like Android, iOS, blackberry Windows OS etc.
- Smart phones are also equipped with innovative sensors, that are responsible for displaying screen in various modes, and, makes it possible for gaming support.
- The earliest touch screen smart phones used resistive touch screen display, which required the use of slender pointing objects. Most of the later models like iPhone & Android phones employ Capacitive displays, which features multi-touch finger gestures.

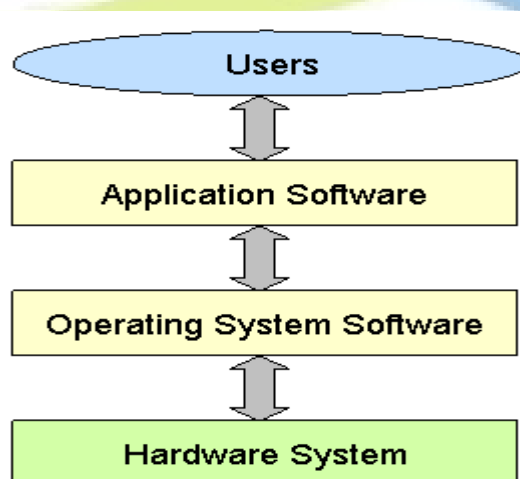
- Smart phones commonly use LCD screen in their display, however OLED displays are becoming more common & preferred by most smart phone manufacturer.
- Following are key features of smart phone:
 - 1) Internet connectivity.
 - 2) A mobile browser
 - 3) Touch screen
 - 4) Wi-Fi
 - 5) The ability to sync more than one email-address to a device,
 - 6) A hardware or software based QWERTY keyboard.
 - 7) Support for third-party applications.
 - 8) A digital camera with video capacity.
 - 9) GPS
 - 10) Unified Messaging
 - 11) The ability to download applications & run them independently.
 - 12) Bluetooth, speaker

NOTE:

LCD = Liquid Crystal Display

OLED = Organic Light Emitting Device.

HARDWARE , SOFTWARE AND FIRMWARE



Hardware is any physical electronic device. Computers, adapter cards and Ethernet cables are examples.

Software is a program that can work on a wide variety of hardware and they are usually copied from non-volatile memory (like hard-disk or SSD) onto volatile memory (like SRAM and DRAM) before they can start executing.

The software come in the form of set up files either in the form of removable media like CDs, DVDs and flash drives or downloaded from the internet straight onto the hard-drive. They are then installed onto the hard-disk. Once invoked, the code to be executed is then transferred to the RAM and run from there.

Examples of software can include Operating systems

Types of Software

Software is a set of instructions, data or programs used to operate computers and execute specific tasks.

The two main categories of software are application software and system software. An application is software that fulfills a specific need or performs tasks. System software is designed to run a computer's hardware and provides a platform for applications to run on.

Operation system(system software). These software programs are designed to run a computer's application programs and hardware. System software coordinates the activities and functions of the hardware and software. In addition, it controls the operations of the computer hardware and provides an environment or platform for all the other types of software to work in. The OS is the best example of system software; it manages all the other computer programs. Other examples of system software include the firmware, computer language translators and system utilities

Firmware is a program that is specifically designed to work with particular hardware and it lives in non-volatile memory such as flash and it is executed directly from it. These kinds of firmware can be found in devices like TVs, washing machines and microwaves

Device drivers are programs that can control a given hardware and provide a software interface to it. Other programs like Operating Systems can interact with the hardware through this software interface without needing to know the actual underlying implementation of the software interface.

An interface is nothing but a group of functions. All operating systems talk to hardware via some predefined software interfaces.

- **Application software.**

1) General purpose software: The most common type of software, application software is a computer software package that performs a specific function for a user, or in some cases, for another application. An application can be a group of programs that run the application

for the user. Examples: office suites, graphics software, databases and database management programs, web browsers, word processors,

2) Customized Software: Sometimes people give the order to create certain special software according to their own specific requirements. Programmers generally develop such software on special demands. This software excludes the extra features of application software. Therefore, only such features are present which the user actually requires for his purpose.

This software is not available on the web. So, one cannot download or use them directly. Moreover, once the programmer creates the software, he gives it to the client with certain terms and rights. Due to these features, we can also name this software as tailor-made software.

For example, a beauty salon's owner needs software to keep track of the bookings. Further, he requires to fix appointments or keep track of his products, etc.

User: We as a user can operate on the computer system through some software by the means of application software through system software on the computer hardware. So as per the architecture shown above it works in hierarchy. User cannot use computer hardware directly without the system software and application software.

